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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/809,929	03/26/2004	Kentaro Nakamura	1081.1196	6769
21171 7590 01/14/2008 STAAS & HALSEY LLP SUITE 700 1201 NEW YORK AVENUE, N.W. WASHINGTON, DC 20005			EXAMINER KIM, DAVID S	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/809,929

Applicant(s)

NAKAMURA ET AL.

Examiner

David S. Kim

Art Unit

2613

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 October 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 4-6 and 19-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 4, 6, 19 and 21 is/are rejected.
- 7) ☒ Claim(s) 5 and 20 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 March 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Drawings

1. The drawings are objected to because of the following items:

On one drawing page, there are two drawings that are labeled "Fig. 5A". The lower drawing should be labeled "Fig. 5B".

In Fig. 9, the third level should read "B21 Δ 24" instead of "B21 A24". The sixth level should read "B22 Δ 25" instead of "B22 A25". The ninth level should read "C21 Δ 26" instead of "C21 A26". The twelfth level should read "C22 Δ 27" instead of having no label.

In Fig. 10A, "P2" should be replaced with "P4".

2. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

3. The disclosure is objected to because of the following informalities. Appropriate correction is required. Examiner respectfully requests Applicant to consider the following suggested changes (additions are underlined portions, deletions are strikethrough portions).

On p. 5, l. 22-24:

"Now the demultiplexing unit will be described with reference to Fig. 1A. The ~~demodulating~~ demultiplexing unit is comprised of the interleavers 1 - 3 and the ~~demodulators~~ demultiplexers 4 - 7."

On p. 18, l. 19-26:

"As graph A1 shows, the central frequency of the transmission band at the port A1 side of the interleaver 1 is shifted 12.5 GHz to the lower frequency side (that is, 12.5 GHz) from the frequencies $f_2, f_2 f_6, \dots$ (200 GHz interval) of the ITU-T grid, (in other words, shifted 37.5 GHz to the higher frequency side (that is +37.5 GHz) from the frequencies f_1, f_5, \dots). Here it is assumed that the shift amount is $-50 \text{ GHz} < S < 50 \text{ GHz}$."

On p. 21, l. 11-21:

"In the graph A1, B1 at the second level in Fig. 4, the transmission characteristics at the output port A1 side of the interleaver 1 is shown by a solid line, and the transmission characteristics at the port B1 side of the interleaver 2 is shown by a broken line. The graph A1 \wedge B1 at the third level shows the transmission characteristics at the output port B1 side of the interleaver 2 when the port A1 of the interleaver 1 is connected to the input port B0 of the interleaver 2, as described with reference, to Fig. 3. This is the same in the graph for A1, B1 B2 at the fifth level and for A1 \wedge B1 B2 at the sixth level."

On p. 28, l. 1-7:

"By using such interleavers 12 and 13, only the WDM signals P2 in the channel ch $[4i - 3]$ are output from the output port B1 B11, and only the WDM signals P2 P3 in the channel ch $[4i - 1]$ are output from the output port B2 B12. Also only the WDM signals P1 in the channel ch $[4i - 2]$ are output from the output port C1 C11, and only the WDM signals P4 in the channel ch $[4i]$ are output from the output port C2 C12."

On p. 28, l. 24 – p. 29, l. 6:

"The WDM signals ~~P1 and P2~~ P2 and P3 pass through the interleaver 12, so as to be filtered and multiplexed based on the transmission characteristics (graphs B11 and B12 in Fig. 6) of the interleaver 12, and be input to the input port A11 of the coupler 11 from the output port B10.

The WDM signals ~~P3~~ P1 and P4 pass through the interleaver 13, so as to be filtered and multiplexed based on the transmission characteristics (graphs C11 and C12 in Fig. 6) of the interleaver 13, and be input to the input port A12 of the coupler 11 from the output port C10."

On p. 32, l. 1-11:

"As the solid line graph B22 in the fifth level shows, the transmission characteristics of the interleaver 22 at the output port B22 side are the opposite of the transmission characteristics at the output port B21 side, where the central frequency of the transmission band is shifted +37.5 GHz from the frequencies $f_3, f_7, \dots (f [4i - 1])$. Also as the graph 25 shows, the transmission characteristics of the demultiplexer 25 are the opposite of the transmission characteristics of the demultiplexer 24, where the central frequency of the transmission band is shifted ~~-37.6~~ -37.5 GHz from the frequencies f_3, f_7, \dots "

On p. 32, l. 22-27:

"As the solid line graph C21 in the eighth level shows, in the transmission characteristics at the port C21 side, the central frequency of the transmission band is shifted -12.5 GHz from the frequencies f_2, f_6, \dots . The central frequency of the transmission band of the demultiplexer 26 is shifted ~~-12.5~~ +12.5 GHz from the frequencies f_2, f_6, \dots "

On p. 33, l. 10-20:

"As the solid line graph C22 shows, the transmission characteristics of the interleaver 23 at the output port C22 side are the opposite of the transmission characteristics at the output port C21 side, where the central frequency of the transmission band is shifted -12.5 GHz from the frequencies $f_4, f_8, \dots (f [4i])$. Also as the graph 27 shows, the transmission characteristics of the demultiplexer 27 are the opposite of the transmission characteristics of the demultiplexer 26, where the central frequency of the transmission band is shifted ~~-37.5~~ +12.5 GHz from the frequencies ~~f_3, f_7~~ f_4, f_8 , \dots "

On p. 34, l. 16 – p. 35, l. 3:

"In the multiplexing unit 24, 10 Gbit/s signal lights in the channel $ch [4i - 3]$ are input and are multiplexed into the WDM signals P2. The WDM signals P2 are input to the input port B21 of the interleaver ~~22~~. In the multiplexing unit 25, 10 Gbit/s signal lights in the channel $ch [4i - 1]$ are input and are multiplexed into the WDM signals P3. The WDM signals P3 are input to the input port B22 of the

interleaver 22. In the multiplexer 26, the 40 Gbit/s signal lights in the channel ch [4i - 2] are input and are multiplexed into the WDM signals P1. The WDM signals ~~P3~~ P1 are input to the input port C21 of the interleaver 23. In the multiplexer 27, 40 Gbit/s signal lights in the channel ch [4i] are input and are multiplexed into the WDM signals P4. The WDM signals P4 are input to the input port C22 of the interleaver 23.”

On p. 38, l. 10-11:

“Now, the multiplexing unit shown in Fig. ~~4B~~ 10B will be described in brief.”

On p. 39, l. 27 – p. 40, l. 7:

“The demultiplexing unit is comprised of a coupler 11 and demultiplexers ~~51~~ 31 and 52. The coupler 11 is the same as that in the second embodiment shown in Fig. 6, which is denoted with the same reference numerals, and the narrowband interleaver 31 is the same as that in the fourth embodiment, which is denoted with the same reference numerals. The signal light P0 is also the same as that described in the previous embodiments.”

On p. 44, l. 13-16:

“For the demultiplexer 65, an AWG filter with a transmission band, where the central frequency is ~~f10, f40, f80~~ f3, f6, f9, . . . with a 150 GHz interval and a bandwidth is at least ~~25~~ 75 GHz, for example, can be used.”

On p. 45, l. 9-25:

“The graph B62 in the sixth level shows the transmission characteristics of the interleaver 62 at the output/port B62 side, and these transmission characteristics are the opposite of the transmission characteristics at the output port B61 side (graph B61). Therefore only 10 Gbit/s signals in channels ch2, ch6, ch10, . . . are output from the output port B62, and the other 10 Gbit/s signals are removed. The 10 Gbit/s signals ~~where were~~ which are output are demultiplexed into the signal lights with respective wavelengths by the demultiplexer 64.

In the multiplexing unit in Fig. 14B, the 10 Gbit/s signals in channels ch1, ch3, ch5, ch7, ch9, ch11, . . . input to the multiplexer 63, and multiplexed, then are input to the input port B61 of the interleaver 62.

The 10 Gbit/s signals in channels ch2, ~~ch4~~ ch6, ch10, . . . are input to the multiplexer 64 and multiplexed, then are input to the input port B62 of the interleaver 62.”

On p. 46, l. 26 – p. 47, l. 3:

“To this demultiplexing unit as well, the WDM signals P0 P10, in the same signal array as the sixth embodiment, are input. The WDM signals P0 P10, which were input, are branched into two by the coupler 11, and are input to the interleavers 62 and 61 respectively.”

On p. 47, l. 17-27:

“Based on the transmission characteristics shown in the fourth level, a part of the 40 Gbit/s signal components r4, r5, r6, . . . are output from the output port B62 of the interleaver 62, in addition to the 10 Gbit/s signals in the channels ch2, ch6, ch10, . . . (see fifth level). The signals and a part of the components which were output are input to the demultiplexer 64, are demultiplexed into each signal, and are output. By not using the output terminals, where a part of the components r4, r5, r6, . . . are output, out of the output terminals of the demultiplexer ~~63~~ 64, these components can be removed.”

On p. 48, l. 6-12:

“In the multiplexing unit shown in Fig. 16B, 10 Gbit/s signals in the channels ch1, ch3, ch5, ch7, ch9, ch11, . . . are input to the multiplexer 63, and multiplexed, then are input to the input port B61 of the interleaver 62. The 10 Gbit/s signals in the channels ch2, ~~ch4~~ ch6, ch10, . . . are input to the multiplexer 64, and multiplexed, then are input to the input port B62 of the interleaver 62.”

On p. 48, l. 18-22:

“The interleaver 62 multiplexes the WDM signals from the multiplexers 63 and 64, and inputs the WDM signals after multiplexing to the coupler 11. The interleaver 61 inputs the WDM signals from the multiplexer 65 to the coupler 11. By this, the WDM signals P0 P10 are output from the coupler 11.”

4. The abstract of the disclosure is objected to because of its undue length. Correction is required. See MPEP § 608.01(b).

Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of **50 to 150 words**. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided.

The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

Claim Objections

5. **Claims 4, 6, 19, and 20** are objected to because of the following informalities. Appropriate correction is required. Examiner respectfully requests Applicant to consider the following suggested changes (additions are underlined portions, deletions are strikethrough portions).

Claim 4. "...the wavelength division multiplexing signal includes a first signal ~~light~~ lights, each with a transmission bandwidth F_1 , and a second signal ~~light~~ lights, each with a transmission bandwidth F_2 , which are arrayed alternately with the frequency interval F ($F \geq (F_1 + F_2)/2$), wherein $F \geq (F_1 + F_2)/2$, said demultiplexing unit further comprising:

a first interleaver having a first input port, inputting the wavelength division multiplexing signals, and first and second output ports filtering and outputting, to the first output port, the wavelength division multiplexing signals based on the transmission characteristics where the transmission band and the non-transmission band with the bandwidth $2F$ are alternately repeated, and filtering and outputting to the second output ~~ports~~ port, the wavelength division multiplexing signals based on transmission characteristics opposite to the transmission characteristics for the first output port;...

...wherein the central frequency of the transmission bands of the first, second and third interleavers are shifted from the central frequency of the signal ~~band~~ bands of the ~~first and~~ second signal lights so that the overlapping portion of the transmission bands of the first and third output ports includes the signal ~~band~~ bands of a first set of the second signal ~~light~~ lights, the overlapping portion of the transmission bands of said first and fourth output ports include includes the signal ~~band~~ bands of a first set of the first signal ~~light~~ lights, the overlapping portion of the transmission bands of the second and fifth ports include includes the signal ~~band~~ bands of a second set of the first signal lights, and the overlapping portion of the transmission bands of the second and sixth ports include includes the signal bands of a second set of the second signal lights."

Claim 6. "The optical receiver according to Claim 4, wherein said demultiplexing unit further includes ~~a demultiplexer~~ demultiplexers demultiplexing signal lights that are output from respective said third to sixth output ports to signal lights with respective wavelengths."

Claim 19. "...a second signal light group consisting of a plurality of signal lights each having a transmission bandwidth F_2 and being arrayed at the positions at frequency interval F ($F \geq (F_1 + F_2)/2$), wherein $F \geq (F_1 + F_2)/2$ from the central frequency of each signal light constituting the first signal light group;...

...a first interleaver which further comprises a first port inputting the first signal light group with transmission characteristics in which the transmission band and the non-transmission band with the bandwidth $F \geq F$ are alternately repeated, and a second port inputting the second signal light group with opposite transmission characteristics from the first port, and multiplexes and outputs the first and second signal light groups which were input to the first and second ports, respectively;

a second interleaver which further comprises a third port for inputting the third signal light group with transmission characteristics where the transmission band and the non-transmission band with the bandwidth $F \geq F$ are alternately repeated, and a fourth port inputting the fourth signal light group with the opposite transmission characteristics from the third port, and which multiplexes and outputs the third and fourth signal light groups which were input to the third and fourth ports; and

a third interleaver which further comprises a fifth port for inputting signal lights from the first interleaver with the transmission characteristics where the transmission band and the non-transmission band with the bandwidth $F \geq F$ are alternately repeated, and a sixth port for inputting signal lights from the second interleaver with the opposite transmission characteristics from the fifth port, and which multiplexes and outputs the signal lights which were input to the fifth and sixth ports,

wherein the central frequency frequencies of the transmission bands of the first, second and third interleavers are shifted from the central frequency of each signal light of the ~~first and second~~ and fourth signal light groups so that the overlapping portion of the transmission bands of the first and fifth ports include includes the signal ~~band~~ bands of each signal light of the first signal light group, the overlapping portion of the transmission bands of the second and fifth ports include includes the signal ~~band~~ bands of

each signal light of the second signal group, the overlapping portion of the transmission bands of the third and sixth ports include includes the signal ~~band~~ bands of each signal light of the third signal light group, and the overlapping portion of the transmission bands of the fourth and sixth ports include includes the signal ~~band~~ bands of each signal light of the fourth signal light group.”

Claim 20. “...the central frequency of the transmission band of the first and fourth ports shift shifts $F_{1/2}$ to the higher frequency side from the central frequency of each signal light of the ~~second~~ fourth signal light group, and...”

Allowable Subject Matter

6. The indicated allowability of **claims 19 and 21** are withdrawn in view of the newly discovered reference(s) to Nakamura et al. (U.S. Patent Application Publication 2005/0041975 A1, hereinafter "Nakamura"). Double patenting rejections based on the newly cited reference(s) follow.

7. **Claims 5 and 20** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Double Patenting

8. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

9. **Claims 4, 6, 19, and 21** are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 29 of Nakamura. Although the conflicting claims are not identical, they are not patentably distinct from each other because the invention of claim 29 of

Nakamura contains an apparatus that corresponds closely to the apparatus in claims 4, 6, 19, and 21 of the instant application. This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Regarding claim 4, notice that the language is substantially similar to the language of claim 29 of Nakamura. In particular, notice the similar "signal lights", "first interleaver", "second interleaver", "third interleaver", and arrangement of "central frequency of the transmission bands".

Regarding claim 6, claim 29 of Nakamura does not expressly disclose the additional demultiplexer. However, the use of an additional demultiplexer would be an obvious variation for the common utility of further demultiplexing channels from signals that contain more than one wavelength channel.

Regarding claims 19 and 21, the apparatus disclosed in claims 19 and 21 correspond closely to the apparatus disclosed in claims 4 and 6, respectively. However, the main difference is that the apparatus disclosed in claims 19 and 21 is used for demultiplexing while the apparatus disclosed in claims 4 and 6 is used for multiplexing. Nonetheless, it appears that the apparatus is actually the same single apparatus. That is, claims 19 and 21 disclose its usage in one direction (demultiplexing) while claims 4 and 6 disclose its usage in the opposite direction (multiplexing). Accordingly, since the same apparatus of claims 4 and 6 is disclosed also in claims 19 and 21, claims 19 and 21 are also rejected. Moreover, the usage of a demultiplexing apparatus as a multiplexing device in the reverse direction is a common practice in the art. Accordingly, the use of the demultiplexing apparatus of claim 29 of Nakamura as a multiplexing apparatus in the reverse direction would be an obvious variation.

Conclusion

10. The references made of record and not relied upon are considered pertinent to applicant's disclosure.

Su et al. (U.S. Patent Application Publication No. 2003/0099013 A1) is cited to show an asymmetric interleaver (Figs. 11 and 12).

Matsuda (U.S. Patent Application Publication No. 2005/0013615 A1) is cited to show a wavelength variable filter (Figs. 8 and 9).

Ji et al. (U.S. Patent Application Publication No. 2007/0116468 A1) is cited to show the use of alternating interleavers (e.g., Fig. 3) and asymmetric outputs (e.g., Fig. 6).

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David S. Kim whose telephone number is 571-272-3033. The examiner can normally be reached on Mon.-Fri. 9 AM to 5 PM (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth N. Vanderpuye can be reached on 571-272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DSK


KENNETH VANDERPUYE
SUPERVISORY PATENT EXAMINER